The end of the heparin pump?

There are two strong arguments for including a doctor, preferably a surgeon, on the inquiry: understanding and credibility. Juries include no experts, yet sit in judgment on the most complex and awful crimes—but this is no crime. Those who put their fingers into the hearts and brains of others to try and save their lives are qualitatively different from those who don't: it requires a special kind of courage and a mixture of compassion and detachment that most find difficult to muster. Only another surgeon can understand fully the difficulties that the Bristol surgeons faced.

To succeed in its mission to understand, explain, and improve the public inquiry will have to command the credibility of all parties. The GMC clearly failed, as views expressed in this issue show (p 1579, 1592),[13 14] and the inquiry may have an almost impossible task—because it starts in a climate of deep division and bitterness. The inquiry will lose the credibility of many, probably most, doctors if it starts without a doctor on the panel. The difficult challenge is to find a doctor who is not seen as a stooge of the establishments of either medicine or the Department of Health.

Meanwhile, the government and the medical profession want to restore the public's confidence in the competence of doctors and the quality of care within the NHS. They must achieve this against a flood of adverse media reports, which makes careful thought difficult and increases the pressure to do something, no matter how hasty and ill considered.

What might the perfect system look like? One long philosophical tradition, represented best perhaps by Thomas Hobbes, believes that people are essentially bad and need to be tightly regulated to stop them doing ill. Another tradition, represented by John Locke, believes that people perform best if trusted, given space and resources, and essentially left to their own devices. Hobbesians might favour government control of doctors, Lockeians self regulation. Probably a mix is needed and a wider concept of self regulation that includes good management.[15] Perhaps we are headed in the right direction with a re-energised GMC with heavy lay representation and the new systems of clinical governance. The danger is, however, that it's all too much and too confused. Doctors now face revalidation, compulsory continuing medical education and audit, governance of their clinical activity by their trust or primary care group, peer review, and a possible visit from a hit squad from their college or from the Commission for Health Improvement. The dangers are that their internal motivation (the most important thing) is crushed, that their time is diverted into activities that are more bureaucratic than beneficial to patients, and that they resort to game playing to buck the system (something at which doctors are highly skilled). Out of this muddle doctors and politicians must produce a more coherent system of regulation and governance that is credible to both patients and doctors.

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The end of the heparin pump?

Low molecular weight heparin has many advantages over unfractionated heparin

Antithrombotic therapy with intravenous unfractionated heparin has been the mainstay of early treatment of patients with venous thromboembolic disease and unstable angina. On a typical medical ward several patients will be attached to syringe drivers containing heparin. Management of these patients is time consuming: heparin infusions have to be made up daily, intravenous cannulas resited, blood samples analysed for monitoring of coagulation control, and doses adjusted on the basis of these results. The potential for dosing errors is high: even in trials with criteria for dose monitoring, over 60% of patients are overanticoagulated or underanticoagulated 24 hours after the start of heparin therapy.[1] Newer low molecular weight heparins are much easier to administer, but do they have other advantages over unfractionated heparin?

The benefit of heparin treatment to patients with venous thromboembolic disease and unstable angina has been shown in several trials. In the only placebo controlled trial of heparin in pulmonary embolism the mortality rate was so much lower in treated patients that the trial was stopped.[2] In unstable angina several randomised trials have indicated a trend towards reduced risk of death and non-fatal myocardial infarction in patients treated with aspirin and heparin compared with aspirin alone. A meta-analysis of these trials indicated a relative risk reduction of 33% with combined aspirin and heparin in patients whose absolute risk of death or myocardial infarction is 14% in the first three months.[3]

Conventional unfractionated heparin refers to a family of mucopolysaccharides of varying chain length and composition which are not separated into

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their component parts. Heparin forms a high affinity complex with antithrombin III, which inhibits thrombin and activated factors X, IX, and XI, depending on the chain length of the heparin molecule. Unfractionated heparin has an antifactor Xa:antithrombin ratio of 1:1. Over the past decade a family of low molecular weight heparins has been developed, based on the principle that inhibiting the earlier amplification stages of the coagulation cascade will provide more effective anticoagulation. These molecules have an antifactor Xa:antithrombin ratio of 2:1 to 4:1. Low molecular weight heparins have several other theoretical therapeutic advantages: higher bioavailability after subcutaneous injection, longer half life, and a lower propensity to induce thrombocytopenia. Haemorrhagic complications may also be reduced because, in contrast with unfractionated heparin, low molecular weight heparins have lower affinity for von Willebrand factor, have a weaker inhibitory effect on platelet function, and are less prone to increasing vascular permeability. Their high bioavailability and antifactor Xa activity confer a predictable dose response, which allows administration on a per kilogram basis without the need for routine anticoagulation monitoring. Indeed, most preparations can be administered by weight adjusted twice daily injection.

But are these preparations as effective as unfractionated intravenous heparin? Trial evidence is accumulating that they are. In patients with unstable angina or non-Q wave myocardial infarction, the FRIC and ESSENCE studies showed, respectively, that dalteparin and enoxaparin are at least as effective as unfractionated heparin at preventing death, myocardial infarction, and recurrent angina.[4 5] Neither study used anticoagulant monitoring in patients receiving the low molecular weight preparation, and there was no difference between groups in the incidence of major and minor haemorrhagic complications. However, no trial evidence currently exists to support the use of low molecular weight heparins as an adjunct to thrombolysis.

Low molecular weight heparins are effective in treating venous thromboembolic disease. In a study of 432 patients with proximal deep venous thrombosis intermittent subcutaneous logiparin substantially reduced the incidence of death and major haemorrhage compared with intravenous unfractionated heparin.[6] Similar results are seen with fraxiparine; enoxaparin and dalteparin are at least as safe and effective as unfractionated heparin.[7] Furthermore, patients can be taught to administer low molecular weight heparins at home, and there are clear economic advantages in reducing the time in hospital.[8 9] Finally, subcutaneous tinzaparin has recently been shown to be as safe and effective as unfractionated heparin in managing the early phase of acute pulmonary embolism in hospital.[10]

The practical advantages of low molecular weight heparins are less compelling for thromboembolism prophylaxis, since in this setting unfractionated heparin is also administered subcutaneously and anticoagulant monitoring is not required. However, a recent meta-analysis of 22 trials of low molecular weight heparins for prophylaxis against venous thromboembolism in orthopaedic surgery showed that they are better and safer than unfractionated heparin and warfarin.[11] In some high risk settings, for example after major trauma, low molecular weight heparins may be better than unfractionated heparin.[12]

Although low molecular weight heparins are more expensive than unfractionated heparin, cost savings are likely through savings in consumables and staff time. Their economic impact must also be assessed in terms of the effect on complications of unstable angina and the cost of subsequent procedures: a cost benefit analysis from the United Kingdom subgroup in the ESSENCE study estimated savings of over £2300 per 100 patients treated with enoxaprin.[13]

Caution is clearly needed when considering practical procedures such as arterial sampling or central venous line insertion in patients treated with low molecular weight heparin—no infusion pump is present as a reminder that the patient is receiving anticoagulant therapy. Furthermore, guidelines need to be established for safe timing of arterial sheath removal after coronary angiography and intervention in patients treated with low molecular weight heparin. Also, important differences exist in the properties of the different preparations: they are not interchangeable, and regimens proved in trials should be used for those specific clinical applications. Moreover, in certain circumstances it is sensible to use intravenous heparin because it can be discontinued abruptly—for example, in patients with mechanical valves undergoing surgery or in patients at high risk of bleeding. Nevertheless, and with these caveats, it is time to abandon the heparin pump for the prophylaxis and treatment of venous thromboembolic disease and for managing patients with unstable angina.

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Clinical futures

Are as important to health policy as economic and social futures

Speculation about the future of medicine often centres on anticipated or imagined breakthroughs in science and technology and on the possible impact of these advances in preventing and treating disease. Yet much of the thinking about health policy has stemmed from the perspectives of political, social, economic, legal, and organisational theory. It is time to move the two closer together.

This week sees the publication of a book of essays by a number of distinguished clinical investigators who were invited to take a freewheeling look at the likely trends in diagnosis and treatment over the coming decades.[1] Our concern in undertaking this exercise was to redress a balance and to create a forum for the strategic thinking of clinicians and others engaged in pushing forward the boundaries of medical science and services.

Doctors, and particularly clinical innovators, have not suffered from a lack of critics from both within and without the profession. Zola, for example, lamented the "medicalisation" of society[2] and Illich doctors' "expropriation" of health.[3] In all this there is evidence of a fashionable cynicism about the good intentions of medical (and other) scientists, grafted on to a historical distrust of a powerful profession. These attitudes are echoed in public policy. In the past decade many of the shortcomings of the NHS have been blamed on the enthusiasm of doctors for biotechnical innovation. Indeed, the internal market was introduced largely to reclaim the service from such "provider capture."

The likely scale of medical advance over the coming decades is such that the role of the doctor will need to change radically in response to new technologies and new demands. However, too little attention has been given to the nature of the metamorphosis that will be necessary to prepare the medical profession for the future or to the contribution that medicine could make to shape society.

The term "medicine" covers an ever widening set of activities as diverse as the functioning of health action zones, stereotactic neurosurgery, and forensic psychiatry. We share with many the conviction that there are important core values that link such kaleidoscopic elements of medical practice and that these need to amount to more than professional self preservation and self interest if common objectives are to be pursued in partnership with government, the public, and industry. Unless medicine is to be relegated to a largely technical function doctors will need to play a more prominent and creative role in developing health policy than hitherto and to discover a coherent voice to articulate physicians' values. To build the new relationships necessary for this more integrated contribution, the profession must first correct—with urgency—its historical tolerance of variable practice, standards, and outcomes.

Not only is medicine immensely diverse, but it is backed by a vast international research effort. To secure a more effective and imaginative harnessing of social as well as biological and physical science, we will need to rethink the organisation of conventional academic medical centres and reappraise the policies of research funding bodies.

By far the biggest challenge is to achieve a better fit between medicine and the health problems and aspirations of people. In a way the publication of our book, which was created on an internet site with comment from collaborators from far afield, momentarily interrupts our experiment just when it was getting interesting. Informal discussion with the authors and their networks of colleagues indicated that there are many here and abroad who are thinking imaginatively about the future. This week, the book is launched at a conference in London. The intention is to bring the imaginative conjectures of clinical investigators to the fore of thinking about the future of health policy. We want to start a process that will strengthen the sometimes muted voice of physicians' values in the debate about the future development of the NHS.

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We hope in time to see a forum of open debate on the internet about the future contribution of medicine and doctors to society.

website *e*xtra

Three chapters from the book appear on our website

www.bmj.com

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